UNIVERSITI PUTRA MALAYSIA

THE EFFECTS OF VERBAL PROBLEM SOLVING INSTRUCTION ON STUDENTS' STRUCTURING ACQUISITION AND RETENTION OF KNOWLEDGE IN METHODS OF COOKING

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FPP 2005 26

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By

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

May 2005

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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Chairperson: **Associate Professor Mohd. Majid Bin Konting, PhD**

Faculty: **Educational Studies**

The purpose of this study is to examine the effects of teaching verbal problem solving to students' structuring, acquisition and retention of knowledge in Methods of Cooking. The study is carried out on 148 students from two classes each of Catering Technology (n=77) and Food Management (n=71). Taken as intact, the classes are randomly assigned into two experiment (n=37; n=35) and two control (n=40; n=36) groups. Using a quasi-experimental of non-equivalent control group of pretest, posttest and delayed posttest design, 10 treatment of teaching using verbal problem solving is given for a duration of 40 minutes of classroom teaching for four weeks. For the pretest, posttest and delayed posttest, parallel achievement tests are used to demonstrate the amount of knowledge acquired and retained after the treatment. A concept mapping test is used to assess the knowledge structure of the students before

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

KESAN PENGAJARAN PENYELESAIAN MASALAH SECARA VERBAL TERHADAP STRUKTUR, PENGUASAAN DAN PENGEKALAN PENGETAHUAN DALAM KAEDAH MEMASAK

Oleh

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Mei 2005

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Tujuan kajian ini ialah untuk mengkaji kesan pengajaran penyelesaian masalah secara lisan ke atas penstrukturan, penguasaan dan pengekalan pengetahuan pelajar dalam Kaedah Memasak. Kajian dijalankan ke atas 148 pelajar daripada dua kelas Teknologi Katering (n=77) dan dua kelas Pengurusan Makanan (n=71). Sampel kajian yang berada dalam kelas asal diperuntukkan secara rawak kepada dua kelas eksperimen (n=37; n=35) dan dua kelas kawalan (n=40; n=36). Dengan menggunakan kaedah kuasi eksperimen kumpulan kawalan tak setara dengan ujian pra, ujian pasca dan ujian pasca yang dilewatkan, rawatan menggunakan penyelesaian masalah secara lisan diberi selama 10 kali 40 minit pengajaran dalam bilik darjah untuk tempoh empat minggu. Untuk ujian pra, ujian pasca dan ujian pasca yang dilewatkan, ujian pencapaian setara digunakan bagi menunjukkan

pengetahuan yang dikuasai dan yang dikekalkan selepas rawatan. Ujian peta konsep digunakan untuk mentaksir struktur pengetahuan pelajar sebelum dan selepas rawatan. Ujian pasca yang dilewatkan bagi pengekalan pengetahuan diberi selepas sembilan minggu tempoh rawatan selesai.

Dapatan kajian menunjukkan bahawa pengajaran penyelesaian masalah dapat meningkatkan dengan berkesan min ujian pasca bagi penstrukturan pengetahuan dalam Kaedah Memasak bagi pelajar dalam kumpulan eksperimen bagi Teknologi Katering ($t=18.23$, $p<.01$); Pengurusan Makanan ($t=23.19$, $p<.01$); dan skor bagi Teknologi Katering dan Pengurusan Makanan yang digabungkan ($t=28.27$, $p<.01$). Dapatan kajian juga menunjukkan min ujian pasca untuk penstrukturan pengetahuan dalam Kaedah Memasak bagi pelajar dalam kumpulan eksperimen adalah lebih tinggi daripada min ujian pasca untuk penstrukturan pengetahuan dalam Kaedah Memasak bagi pelajar kumpulan kawalan bagi Teknologi Katering ($F=47.02$, $p<.01$) dan skor Teknologi Katering dan Pengurusan Makanan yang digabungkan ($F=21.97$, $p<.01$). Min skor ujian pasca bagi penguasaan pengetahuan pelajar dalam kumpulan eksperimen juga adalah lebih tinggi secara bererti daripada min skor ujian pasca pelajar dalam kumpulan kawalan bagi pelajar Teknologi Katering ($F=6.33$, $p<.05$), Pengurusan Makanan ($F=15.46$, $p<.01$) dan skor Teknologi Katering dan Pengurusan Makanan yang digabungkan ($F=21.17$, $p<.01$). Bagaimanapun pengajaran kaedah penyelesaian masalah secara verbal ini tidak dapat membantu dalam pengekalan pengetahuan secara berkesan untuk pelajar-pelajar Teknologi Katering ($F=.30$, $p>.05$), Pengurusan

Makanan (F=1.56, p>.05) dan skor Teknologi Katering dan Pengurusan Makanan yang digabungkan (F=1.45, p>.05).

Kajian ini menunjukkan kaedah pengajaran penyelesaian masalah secara lisan adalah satu strategi pengajaran yang efektif untuk penstrukturan pengetahuan bagi mata pelajaran Teknologi Katering. Kajian juga menunjukkan pengajaran penyelesaian masalah secara lisan ini merupakan satu teknik yang berkesan untuk penguasaan pengetahauan bagi kedua-dua mata pelajaran Teknologi Katering dan Pengurusan Makanan. Bagaimanapun kajian ini menunjukkan bahawa pengajaran penyelesaian masalah secara lisan tidak menunjukkan kesan yang jelas terhadap pengekalan pengetahuan dalam mata pelajaran Teknologi Katering dan Pengurusan Makanan.

ACKNOWLEDGEMENTS

This research has been developed through the cumulative contributions and efforts of many people, without which would not have been able to be conducted successfully. Hence, I would like to express my most sincere gratitude, appreciation and thanks to the following individuals:

I would like to express my sincere thanks and extend my greatest appreciation to my supervisory committee members consisting of Associate Professor Dr. Mohd. Majid Bin Konting, Associate Professor Dr. Rosini Binti Abu and Dr. Samsilah Binti Roslan, for having unwavering concern, kindness, sympathy and patience in discussing meticulously all the problems and obstacles with critical and constructive ideas and also to validate my instruments. And most of all, they have guided me to view events in a clear perspective and comprehensive manner. Their encouragement has given me the courage and strength to strive for excellence in my area of study.

To fellow lecturers from Universiti Putra Malaysia, Universiti Kebangsaan Malaysia and Universiti Malaya, I would like to convey my sincere thanks for being very generous in sharing their knowledge, expertise, ideas, advice and experiences with me. In addition, the effort and time to validate the instruments for the study is deeply appreciated.

'Thank you' to Professor Joseph D. Novak from Cornell University USA who has kindly guided me in developing the concept mapping instrument for this research and giving me insights about the study. His generosity in giving invaluable views and comments as well as his willingness to communicate through e-mail has helped me to strengthen my theoretical understanding of the Assimilation Learning Theory.

My sincere thanks to Professor Emeritus David P. Ausubel, for being so forthcoming in granting me the permission for modifying his four stage model of problem solving to become the proposed five stage model of problem solving which I have used in my research. I would also like to thank him for giving me his invaluable views about the proposed five stage model of problem solving which have made me more confident in using it for my research.

I would also like to thank Professor Ronald L. VanSickle from University of Georgia Athens and Professor Byungro Son from Korea National University of Education for sharing their thoughts and research findings which have advocated me the confidence in carrying out the research.

I would like to especially thank Dr. Nooreen Binti Noordin of Universiti Putra Malaysia, my husband, Ir. Mohd Zain Bin Tamsir, my brother Abd. Salam Bin Hj. Ahmad Shah and my sister, Mo'minah Binti Hj. Ahmad Shah, for meticulously read, edit and proof read the thesis.

My extension of thanks also goes to the Ministry of Education Malaysia and Technical Education Department of the Ministry of Education for granting permission to conduct the research in the schools concerned and to the supporting staff of various local universities and institution for providing me the assistance and necessary facilities.

My deepest appreciation is also dedicated to the Headmaster of Sekolah Menengah Teknik (ERT) Setapak, Jalan Genting Klang Kuala Lumpur, Pn. Hjh. Zaleha Binti Wahid for granting the permission to carry out the research in her school, the teachers of Sekolah Menengah Teknik (ERT) Setapak, Jalan Genting Klang Kuala Lumpur, especially Pn. Hjh. Narimah Binti Ismail, Pn. Kalsom Binti Ahmad, Pn. Rozita Binti Shahid and Pn. Siti Hawa Binti Md. Salleh, for their endless effort in helping me carry out the research. My deepest gratitude are also to Pn. Hjh. Hassanah Binti Dato' Muhammad Shah of Sekolah Menengah Teknik (ERT) Rembau, Pn. Hjh. Narimah Binti Ismail and Pn. Rozita Binti Shahid of of Sekolah Menengah Teknik (ERT) Setapak, for helping me mark the test papers. My thanks are also for the Form Four students of Catering Technology and Food Management 2003, for their full participation, co-operation and enthusiasm. May their future be always bright prosperous.

To the Headmaster of Sekolah Menengah Teknik (ERT) Rembau, the Headmaster of Sekolah Menengah Teknik (ERT) Azizah Johore Bahru and the Headmaster of Sekolah Menengah Teknik Muar Johore, thank you for allowing me continue to do my pilot study in your school.

To my husband Ir. Mohd Zain Bin Tamsir, I dedicate this special thanks to you for giving me the motivation, encouragement, support, tender loving kindness and consideration for me to pursue my studies.

Last, but not least, thank you very much to my parent in-laws, Hj. Tamsir Bin Hj. Rabidin and Hjh. Zainun Binti Hj. Hussain, my brothers, Abd. Salam and Abd Kudus, my brother in-law, Kamarulizham Bin Hazizi, my sisters, Aminah, Mo'minah and Hanunah, my sister in-law, Zaiton Binti Othman, my son, Muhammad Afiq and daughters, Amanina Fasihah and Aiman Faiqah as well as nieces and nephews, relatives and friends for your prayers, encouragement, invaluable support, loving kindness and compassion.

May you all be well, in good health and always be blessed by Allah.

I certify that an Examination Committee met on 31st May 2005 to conduct the final examination of Aliah Hj. Ahmad Shah on her Doctor of Philosophy thesis entitled "The Effects of Verbal Problem Solving Instruction on Students' Structuring Acquisition and Retention of Knowledge in Methods of Cooking" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

ALIAH BT. HJ. AHMAD SHAH

Date: 18 AUGUST 2005

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LIST OF ABBREVIATIONS

ALT	Assimilation Learning Theory
PGT	Proposition Generating Task
N	Number of subjects
df	Degree of freedom
M	Mean
SD	Standard Deviation
SEM	Standard Error Mean
MD	Mean Difference
MS	Mean Square
P	Significant level
η^2	Etta Squared

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The Assimilation Learning Theory (ALT) by Ausubel (1968) consists of six basic concepts for meaningful learning. The six basic concepts are subsumption, progressive differentiation, integrative reconciliation, obliterative subsumption, superordinate learning and advance organizer. Subsumption is a process whereby new knowledge is accreted from the cognitive structure of the learner. Accretion of new knowledge is facilitated by the availability of preacquired ideas in the cognitive structure. The presence of relevant, clear and stable preacquired ideas in the learner's cognitive structure facilitates meaningful learning. Current knowledge that interacts with the relevant background knowledge in the cognitive structure is assimilated to form new knowledge structure. The construction of new knowledge structures continues through the process of meaningful learning.

As new knowledge is acquired, concepts and propositions become more elaborate. The formation of interconnections of concepts and linkages between concepts take place in a manner of 'progressive differentiation'. As new linkages are formed, subordinate concepts acquire new meanings and 'superordinate learning' takes place. Superordinate learning involves

modifications of previously learned concepts and/or propositions, which also results in progressive differentiation of cognitive structure. As superordinate learning occurs, concepts and propositions that are seen as discrete or in conflict may be integrated into new higher order concept meanings. This process is termed by Ausubel (1968; 2000) as 'integrative reconciliation'. Integrative reconciliation continues as learners gain more meanings and linkages to distinct concepts.

Knowledge gained through meaningful learning is subsumed in the cognitive structure. The new meaningful knowledge is retained much longer than knowledge that is rotely learned. However, learning and forgetting in rote learning are not equivalent to learning and forgetting in meaningful learning. Ausubel (1968; 2000) coined the term 'obliterative subsumption' to represent forgetting in meaningful learning. By obliterative subsumption, a meaningfully gained knowledge is not forgotten entirely. Residual concepts remain after subordinate concepts and details are lost. The residual concepts form anchoring ideas in cognitive structure. These anchoring ideas will be useful to facilitate new relevant meaningful learning when required.

Knowledge could be more easily linked to existing relevant concepts in cognitive structure by the use of 'advance organizer'. Ausubel emphasizes that advance organizers are different from overviews and summaries. Organizers act as a subsuming bridge between new learning material and existing related ideas. The function of an advance organizer is to connect